NON-LETHAL CAPABILITIES OF THE FUTURE

MAJ(P) Arthur J. Aragon Jr.

Background

It is 2014. A U.S. contingency force patrols the buffer zone between two warring factions while peace negotiations continue. This buffer zone is one of many that divides two ethnic groups that have recently unleashed a war on each other, destabilizing the region. Each side of the buffer zone is marked, and warning devices extend nearly 2 kilometers out. After several weeks of quiet, an event sparks a large crowd to form in a nearby town. Suddenly, the crowd begins moving toward the buffer zone. Unmanned aerial vehicles (UAVs) and robotic sensors forward real-time video and information to the U.S. command node near the buffer zone. The crowd is visibly armed with rocks and sticks and ignores all posted and remote voice warnings. A pickup truck, loaded with yet more demonstrators, accompanies the crowd. The contingency force responds quickly. When the crowd is about 1,500 meters out, the U.S. forces send out additional voice warnings from the UAVs over wireless public address systems. The crowd ignores the warnings. U.S. Forces lob several non-lethal mortar rounds just in front of the advancing crowd. The rounds burst overhead, delivering their payload at about 1,000 meters from the buffer zone. The area just in front of the crowd is covered with what appears to be fine gravel. The crowd hesitates, a few individuals turn back, but most, seeing no evident threat, proceed as the voice warnings continue. The U.S. contingent points a small antenna from its primary robotic combat system at the moving vehicle; the vehicle suddenly stops and cannot be restarted. The occupants get out, some continue, others turn back. The remaining crowd, on reaching the area covered by the non-lethal mortar rounds, steps on microencapsulated malodorants that break open emitting an awful smell. As the crowd moves over the "gravel," many demonstrators stop, some continue, and dozens turn back! Special sensors set at 1,000 meters send data back to the command that indicate that among the handful of remaining demonstrators, there are likely a few concealed small arms. The U.S. commander wants to try to keep any potential violent aggressors from getting within small-arms range. A reaction force aims a metal tube at the handful that continue. Intense aversive sounds and pulsing lights are directed against the crowd. Still more demonstrators turn away. The reaction force fires an invisible burst of energy that hits the remainder of the individuals like a punch. The few individuals that remain now dissipate. The crowd has been dispersed, no one is seriously injured, and no demonstrator reached within small-arms range of the buffer zone.

Current Methods

The above vignette is just one of a countless number of potential situations for our future Army. In fact, much of the scenario could play out today. However, today's non-lethal response would be considerably less capable. Currently, beyond the warning devices described, and even with sophisticated sensors, our forces could not reach beyond 100 meters to start impacting the crowd or its vehicles with non-lethal capabilities. The fact that we can now reach out several meters farther than a riot baton says a lot for the achievements in non-lethal capabilities over the past 5 to 6 years. We have rubber-ball ammunition and barriers that have been effectively used in the past couple of years. However, whether it is rubber balls impacting against humans or barriers that must directly contact vehicles to impede their movement, close range and contact are required to deliver today's non-lethal effects.

Future Technologies

Non-lethal capability may one day simply be a selector switch on

the individual armament of the soldier or be provided by dialing up the desired effect (from distract to destroy) on a munition. Until then, the Army, along with the other Services, is exploring various technologies to provide non-lethal capability for the coming years. Non-lethal capabilities for the Army's objective force will need to range farther, be less potentially lethal, and give the user a "kit bag" of capabilities well beyond today's rubber balls and barriers. Some of the potential technologies were mentioned in the scenario above and include aversive acoustics, directed energy countermateriel weapons, and non-lethal fires.

The Army, in conjunction with DOD's Joint Non-Lethal Weapons Directorate, is looking at various non-lethal capabilities for the near future. The Army is also seeking funds to develop non-lethal capabilities specifically for its objective force and Future Combat Systems (FCS). Engineers and scientists, working with users and materiel developers, are investigating capabilities beyond present close-range rubber balls. The non-lethal mortar described in the vignette above is an example with near-term potential. A related part of this program is the development of a mortar round that can disperse non-lethal payloads without the container itself being a dangerous falling object. Parachutes and frangible casings are technologies under consideration by developers to achieve this capability.

The microencapsulated malodorant described in the scenario above as the mortar payload is one of many types of non-lethal payloads being considered among the Services to try and optimize non-lethal payloads with delivery systems. This is a technologically challenging area because each type of payload affects each prospective munition and delivery system differently. One way to possibly address this is through microencapsulation. Microencapsulation is a means of packaging malodorants or other products in very small balls or beads with various levels of protection and consistency. This makes storage, shipping, and weaponization potentially more feasible.

Another potential technology described is aversive acoustics. Aversive acoustics are directed sound waves that are so annoying they will cause most people to want to leave the area where the sound is directed. Think of dozens of fingernails scratching against dozens of chalkboards! Combined with other sensory deprivation devices such as bright flashing lights, this could cause even the most ardent demonstrators to waver in their mission. A big advantage to such technology is that it provides a "deep magazine" and minimal logistics! You have unlimited rounds as long as you have vehicle power, and you don't have to worry about ammunition storage.

Vehicle Stoppage

The scenario above also describes disabling a vehicle from a distance. Vehicle stoppage and countermateriel weapons remain high-priority missions of force protection for commanders throughout the world. Current methods of vehicle stoppage require physical contact with a barrier, tire shredders, Jersey barriers, etc. They usually also require hand emplacement or close proximity of an operator. Future countermateriel capabilities will likely be directed energy weapons that optimally disable materiel from hundreds of meters without causing permanent damage. They could be remotely operated, reusable, and adjusted to affect different targets from vehicles to command and communication nodes.

One of the non-lethal capabilities not addressed in the scenario above, but one that has drawn much interest, is non-lethal fires. This approach incorporates long-range delivered munitions and submunitions to incapacitate vehicles, computer equipment, and other infrastructure without destroying them. However, these munitions could be "rheostatic" or tunable, and with the flip of a switch on the muntion itself or on the fire control system, you set the previously non-lethal weapon to destroy. This offers not only flexible response but also reduces the logistical burden of having to carry, store, and maintain many different types of rounds.

Conclusion

Many mature, relatively low-cost non-lethal capabilities are now or soon will be available. Some are deployed and have been successfully used in actual operations. In addition to participating in the Joint Non-Lethal Weapons Program (JNLWP), each Service also has its own Service-unique non-lethal requirements (i.e., FCS non-lethal for the Army and non-lethal vessel denial for the Navy). JNLWP participants recognize that future non-lethal science and technology investments are required to reach beyond today's rubber balls and physical barriers. Future non-lethal capabilities will need to be more flexible, have a longer standoff range, and offer potential long-term cost savings as compared with current capabilities. Until that day when we can simply "set phasers to stun," the Army and the other Services will continue to press technology for non-lethal solutions.

MAJ(P) ARTHUR J. ARAGON JR. is the Deputy Systems Manager for the Army's Non-Lethal Technology Integration Cell. He has an M.S. in systems acquisition management from the Naval Postgraduate School.